

REMARKS

In view of the above amendments and following remarks, Applicant respectfully requests reconsideration and allowance of the above-identified application.

Claims 1, 2, 4, 5, 9 and 11-22 remain pending in this application, with Claims 1, 2, 4, 5, 9, 11, 12 and 20-22 being independent. By this Amendment, Applicant has amended Claims 1, 2, 4, 5, 9, 11, 12, 18, 19, 20 and 22.

Applicant has amended Claim 11 to avoid the possible double patenting rejection discussed in the Office Action.

Claims 18 and 19 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Applicant has amended Claims 18 and 19 to attend to the matters noted in the Office Action as giving rise to the rejection. Accordingly, Applicant requests withdrawal of the § 112, second paragraph, rejection.

Claims 1, 11, 12, 13-17 and 20-22 stand rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,157,488 (Ishii) in view of U.S. Patent No. 5,048,925 (Gerritsen, et al.). (Claims 2, 4, 5, 9 and 13-19 stand rejected under 35 U.S.C. § 103 as being unpatentable over Ishii and Gerritsen, et al. in view of U.S. Patent No. 5,279,924 (Sakai, et al.). Applicant traverses these rejections.

As generally recited in independent Claims 1, 2, 4, 5, 9, 11, 12 and 20-22, Applicant's invention is directed to a diffractive optical element having a diffractive grating portion. The diffractive grating portion includes a pair of diffractive gratings differing in dispersion from each other and confronting each other through a space having a refractive index of 1. In addition, with respect to independent Claims 1, 2, 4, 5, 9, 11, 12, 20 and 21, a maximum optical path length difference occurring in the diffractive grating

portion with respect to at least two wavelengths is m (integer) times the wavelength, and the values of m in the two wavelengths are the same.

With such a configuration, the invention obtains a high diffractive efficiency across a wide wavelength range including the two wavelengths.

The Ishii patent also describes a diffractive optical element for obtaining a high diffractive efficiency in a wide wavelength range. Similar to the present invention, in the diffractive optical element described in that patent, a maximum optical path length difference occurring in the diffractive grating portion with respect to each of two wavelengths is m (integer) times the wavelength, although this feature appears to be an unexpected consequence of the design. The present invention differs from the optical element described in the Ishii patent in that the diffractive gratings forming the diffractive optical element described in that patent do not face each other across a space having a refractive index of 1. Thus, the Ishii patent fails to suggest the novel and useful configuration of the present invention, as a whole. Not
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The Office Action cites the Gerritsen, et al. patent as describing a structure in which a pair of diffractive gratings face each other across an air gap (reference numeral 64 in Figure 6). However, Applicant submits that the Gerritsen, et al. patent does not suggest that a maximum optical path length difference occurring in the diffractive grating portion with respect to two wavelengths is m (integer) times the wavelength, and that the values of m in the two wavelengths are the same. Thus, the diffractive optical element described in that patent does not obtain a high diffractive efficiency in a wide wavelength range. Further, the air gap described in the Gerritsen, et al. patent is not provided for the

same purpose as that of the present invention. Accordingly, Applicant submits that there is no motivation to combine this feature with the device described in the Ishii patent.

Moreover, Applicant submits that the air gap shown in the Gerritsen, et al. patent could not properly be combined with the features of the diffractive optical element described in the Ishii patent. The Ishii patent indicates that it is necessary to reduce the wavelength dependency of diffraction efficiency by increasing $\Delta N(\lambda)$ with the increase of the wavelength, as set forth in formula 15 of that patent. To achieve this, a combination of a polycarbonate and a material of low refractive index and low dispersion is used. Thus, the disclosure of the Ishii patent assumes the use of a combination of a polycarbonate and a material of low refractive index and low dispersion in order to reduce wavelength dependency of diffraction efficiency. Consequently, one of ordinary skill in the art would not be motivated to make a second optical region (reference numerals 12 and 102 in Figures 6 and 8, respectively, of the Ishii patent) a region with a refractive index of 1, in view of that assumption. In other words, providing a space with a refractive index of 1 goes against the teaching of the Ishii patent. In contrast, in the present invention, $\Delta N(\lambda)$ can be increased by the increase of the wavelength and desired performance can be obtained even if a pair of diffractive gratings face each other across a space having a refractive index of 1.

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“Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art.”

MPEP 2143.01. In addition, “[a] prior art reference must be considered in its entirety, i.e.,

as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).” MPEP 2141.02, p. 2100-122 (Rev. 1, Feb. 2003).

Applicant submits that there is no motivation to combine the Ishii patent and Gerritsen, et al. patent as suggested by the Examiner, and that the disclosure of the Ishii patent teaches away from the modification suggested by the Examiner.

No (The Sakai, et al. patent is merely cited in the Office Action as describing a method of manufacturing optical diffractive gratings having serrated grating portions. Applicant submits that this document fails to remedy the deficiencies discussed above with respect to the Ishii and Gerritsen, et al. patents.

Accordingly, Applicant submits that the Ishii, Gerritsen, et al. and Sakai, et al. patents, taken alone or in combination, fail to disclose or suggest at least the features of a diffractive grating portion having a pair of diffractive gratings, the pair of diffractive gratings differing in dispersion from each other and confronting each other through a space of a refractive index of 1, wherein a maximum optical path length difference occurring in the diffractive grating portion with respect to each of at least two wavelengths, is m (integer) times a wavelength, and the values of m in the two wavelengths are the same, as generally recited in independent Claims 1, 2, 4, 5, 9, 11, 12, 20 and 22. In addition, Applicant submits that these documents, taken alone or in combination, fail to disclose or suggest at least the features of a diffractive grating portion having a plurality of diffractive grating layers laminated with a space layer of a refractive index of 1, the plurality of diffractive grating layers differing in dispersion from each other, wherein the diffractive


grating portion is formed on a light transmitting surface of a lens, as recited in independent Claim 21.

For the foregoing reasons, Applicant requests withdrawal of the rejections under 35 U.S.C. § 103.

The remaining claims in this application are dependent claims which depend from the independent claims discussed above, and are thus patentable over the documents of record for reasons noted above with respect to those independent claims. In addition, each recites features of the invention still further distinguishing it from the applied patents. Applicant requests favorable and independent consideration thereof.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,


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